



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

the soil more easily than the smooth type of grain.

A. E. GRANTHAM

DELAWARE AGRICULTURAL EXP. STATION

A MEANS OF TRANSMITTING THE FOWL
NEMATODE, *HETERAKIS PAPILLOSA*
BLOCH¹

A RECENT experiment demonstrated that the fowl nematode, *Heterakis papillosa* Bloch² may be transmitted to chickens by the feeding of a dung earthworm, *Helodrilus gieseleri hempeli* Smith.³ The thirteen fowls (three of them controls) used in the experiment were hatched in an incubator, reared in a worm-proof field cage,⁴ and given food free from animal tissues, while the dung earthworms were taken from a poultry yard in which the fowls were heavily infected with *H. papillosa*. When these chicks were about five weeks old, they were given dung earthworms every few days until each chick had ingested approximately forty worms. Of ten chicks so fed, four became infected with *H. papillosa*, the results of these examinations being as follows:

Chick 104, examined sixty-four days after first feeding, nine nematodes in the cæca.

Chick 117, examined one hundred thirty-seven days after first feeding, one nematode in the right cæcum.

Chick 128A, examined twenty-nine days after feeding, two nematodes in the cæca.

Chick 130A, examined twenty-seven days after feeding, two nematodes in the cæca. The six remaining chicks and the three controls were free from nematodes.

As is well known, these small nematodes commonly occur in the cæca of fowls, although

they are not infrequently found in the large intestine. Of three hundred ninety-five chickens taken locally and examined in this laboratory during the last three years, two hundred ninety-three (74.1 per cent.) were infected with *H. papillosa*. The average infection was 34.4 nematodes, but a single infection of one hundred nematodes is not uncommon, and in one instance a fowl contained three hundred twenty-six of these parasites.

The means by which chickens become infected with *H. papillosa* is not wholly understood. Evidently, in some cases, a dung earthworm transmits these nematodes, but whether the relation between the two worms is one of parasitism or merely that of an association has not been fully determined. The presence of certain nematodes both free in the nephridia and imbedded in the muscles of earthworms furnishes a suggestive hypothesis. Dung earthworms are of common occurrence in the local poultry yards, and it might be possible to account for the rather heavy nematode infection of fowls from this source alone. But Leuckart long ago pointed out that *H. papillosa* may develop directly, according to Railliet and Lucet,⁵ who, by feeding to a fowl eggs removed from the uterus of *H. papillosa*, secured a direct infection of fifteen of these nematodes. The writer, likewise, has obtained direct infections by giving eggs of this nematode to fowls reared under controlled conditions. These data indicate that the relation of the nematode to the earthworm is that of an association, in which case the eggs of the former might be carried on the slimy surface of the earthworm or in its engulfed food. However, the evidence is not such as to preclude the possibility that this earthworm, *H. gieseleri hempeli*, may, in some way, serve as an intermediate host of *H. papillosa*, and it is hoped that experiments now under way will reveal the nature of this relation.

JAMES E. ACKERT

MANHATTAN, KANS.

¹ Contribution No. 19 from the Zoological Laboratory, Kansas State Agricultural College. Aid of Adams Fund.

² The identification of this nematode has been verified by Dr. B. H. Ransom, Zoologist, B. A. I., U. S. Dept. Agr., Washington, D. C.

³ The earthworms were identified by Professor Frank Smith, University of Illinois.

⁴ The field cage with its floor and eighteen-inch walls of cement is so constructed as to be practically insect-proof also. Examinations of control chickens every few weeks for three years have not yielded a single parasitic worm.

⁵ Railliet, A., et Lucet, A., "Observations et expériences sur quelques helminths du genre *Heterakis* Dujardin," *Bull. Soc. Zool. France*, Par., 17: 117-120, 1892.